

Many systemic drugs have ocular side effects, some of which are potentially sight threatening. It is important to monitor and screen patients on these drugs as early detection and reporting to appropriate medical practitioners may be critical in preventing irreversible vision loss. This chairside reference describes the major potential ocular side effects related to selected systemic drugs, in particular those that with RPE/retinal implications. Non-vision threatening toxicity such as vortex keratopathy from amiodarone is outside the scope of this reference.

This reference provides recommendations on the workup and ongoing follow-up intervals in an optometric setting. It is not intended to cover the spectrum of all ocular side effects of systemic drugs (e.g. drugs that induce mydriasis, dry eyes, and steroids), nor is it designed to provide guidance on intervention or treatment.

Drug Name	Use	Potential Sight Threatening Complication	Onset ^	Signs & Symptoms	Clinical Examination Recommendation*					Screening Recommendation
					CV	VF#	CFP	OCT	FAF	
Amiodarone (Cordarone)	Anti-Arrhythmia	Optic neuropathy	Months	Insidious visual loss (mostly bilateral), colour vision abnormalities, variable field defect, disc oedema.	•	• 30-2	•	•		Baseline evaluation before treatment, every 4, 8 and 12 months after treatment initiation, yearly thereafter or on an as-needed basis depending on clinical findings.
Fingolimod (Gilenya)	Anti-multiple sclerosis	Macular oedema	Months	Painless blurred vision, metamorphopsia, reduced VA.		• Amsler	•	•		Baseline evaluation before treatment, 3-4 months after treatment initiation. Advise patient to use Amsler grid self-monitoring. Patients with diabetes and uveitis are at a higher risk and may need to be screened more closely. Patients who undergo intraocular surgery also need pre and post-operative assessment.
Chloroquine (Nivaquine, Avlocor), Hydroxychloroquine (Plaquenil)	Anti-malarial, Anti-rheumatologic	Bull's eye maculopathy	Years	Paracentral scotoma, nyctalopia, focal thinning of photoreceptors and RPE abnormality (early), vision loss and Bull's eye maculopathy (later).		• 10-2 for all, 30-2 (if FAF abnormal)	•	•	•	Baseline evaluation within the first year and yearly screenings begins after 5 years , sooner if risk factors (high dosage HCQ>5.0mg/kg real weight, CQ>2.3mg/kg real weight, long duration>5 years, renal disease, tamoxifen use, concomitant macula disease) are present.
Tamoxifen (Nolvadex)	Anti-neoplastic	Crystalline maculopathy, macular oedema	>1 year	Often asymptomatic. Bilateral fine deposits in perifoveal region, foveolar cyst, Visual acuity loss if macula oedema or haemorrhages present.	•		•	•		Baseline evaluation within first year and then 3-6 monthly if symptomatic. No continued screening is required if there is absence of signs and symptoms.
Interferon-alfa (Intron, Rebetrone)	Anti-neoplastic	Ischaemic retinopathy Optic neuropathy	Months	Often asymptomatic, intraretinal haemorrhages and/or cotton wool spots (CWS).			•	•		Baseline evaluation before treatment and 3 monthly assessments thereafter.
Vigabatrin (Sabril)	Anti-epileptic	Irreversible field restriction	Months to years	Normal VA, bilateral, concentric or bi-nasal visual field defects, fundus is typically normal. May have disc pallor, arteriolar narrowing and/or abnormal macular reflexes.		• HVA full field screening or kinetic perimetry		•		Initial visual field screening before treatment then every 6 months for 5 years . Yearly thereafter if no defects are present. If a visual field defect is noted, repeat within one month to confirm. Use threshold 30-2 to monitor progression. Electrophysiology is indicated if field testing is not viable.

^ Onset may vary depending on dose and duration.

* In addition to comprehensive dilated fundus examination. Key: CV: colour vision; VF: visual field; CFP: colour fundus photograph; FAF: fundus autofluorescence

Visual field test program and pattern outlined are based on Humphrey Visual Field Analyser (HFA), equivalent tests are available in other perimeters

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Topiramate (Topamax)	Anti-epileptic	Angle closure glaucoma	Weeks	Blurred vision, ocular and/or periorbital pain, headache, increased IOP, myopic shift, angle closure, cilio-choroidal effusion.	Gonio /UBM					Baseline evaluation should include gonioscopy. Routine review is not recommended. Warn patients of side effects and symptoms and to seek urgent attention if they occur.
Thioridazine (Aldazine) Chlorpromazine (Thorazine)	Antipsychotic	Pigmentary retinopathy	Months	Slightly reduced VA, nyctalopia, dyschromatopis, Salt-and-pepper pigmentary disturbance in mid-periphery and posterior pole, focal or diffuse loss of RPE and choriocapillaris.	•		•	•	•	Baseline evaluation followed by yearly review or sooner for high dose (>600mg per day)
Ethambutol (Myambutol)	Anti-tubercular	Optic neuropathy	Months	Sudden vision loss, colour vision abnormalities, central scotoma, normal or slightly swollen optic nerve.	•	• 30-2	•	•		Baseline evaluation before treatment, followed by every 4 weeks if daily dose>15mg/kg, every 3-6 months for lower dose
Canthaxanthin	Anti-psoriasis	Crystalline maculopathy	Dose dependent	Often asymptomatic, refractile, yellow-orange deposits form a ring-like pattern in perifoveal region.			•	•		Baseline evaluation followed by yearly review
Deferoxamine (Desferal, Desferrioxamine, deferasirox)	Iron chelator for transfusional haemosiderosis	Pigmentary retinopathy, optic neuropathy	Months	Decreased vision, nyctalopia, dyschromatopisa, field loss, multiple discrete hypo-pigmented lesions at posterior pole and mid-peripheral retina.	•	•	•	•	•	Baseline evaluation followed by screening at 6-monthly intervals. Electrophysiology may be helpful in monitoring retinal dysfunction
Filler for intravenous narcotics	Talcum powder	Macular/retinal ischaemia; crystalline maculopathy	Unknown	Decreased vision, scotoma, bilateral hyper-reflective intraretinal small yellow deposits in macula, arterial occlusion, CWS, AV anastomosis, neovascularisation of the disc or in the periphery.			•	•		Baseline evaluation for current and past IV drug users For active IV drug users, monitor routinely for emboli and their ischemic sequelae
Methanol	Solvent, anti-freeze, recreational	Optic neuropathy	Within hours with high dose	Decreased central and/or peripheral vision, colour vision abnormalities, disc atrophy.	•	• 30-2	•	•		Baseline evaluation should include a detailed history to identify other factors associated with toxic/nutritional optic neuropathy such as tobacco/alcohol abuse, vitamin deficiencies etc.

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